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原 寛*・黒澤幸子*: ヘビイチゴ類について

Makino in 1914 and 1921 made clear that there are two kinds of *Duchesnea* in Japan. The differences between the two plants are summarized below, with additional characters observed by us.

Achenes smooth or obsoletely elevated-nerved, glossy when fresh. Fruiting receptacles bright red glossy 11–20 mm across, with a red neck. Plants generally larger in all respects. Leaves deeper green, leaflets obovate—rhombic-oblong, up to 4–7 cm long, lateral ones often bifid. Dodecaploid (2n=84). .... **A**

Achenes distinctly rugose-tubercled, not shinning. Fruiting receptacles pinkish white not shinning 8–12 mm across, with a whitish neck. Plants smaller. Leaves yellowish green, leaflets rounded-obovate, less than 3 cm long 2.5 cm wide. Diploid (2n=14). .... **B**

The first botanist who noted the presence of these two races in Japan is Franchet (1873), who treated the plant B as *β. Wallichii*. In 1921 Makino regarded the plant B as *Duchesnea indica* (Andr.) Focke, and described the plant A as a new species, *D. major* Makino. However, Nakai noticed during his trip (1923–25) in Europe that the plant A was actually identical with *D. indica*, and he referred the plant B to *D. Wallichiana* (Seringe) Nakai, probably following the opinion of Franchet. Quite independently Odashima in 1935 distinguished these two plants in Taiwan (Formosa), and correctly identified the plant A as *D. indica*, and described the plant B as a new species, *D. formosana*. Handel-Mazzetti also made a remark in 1933 under *Potentilla indica* that 'Die japanische Pflanze scheint durch einen ganz anderen Zuschnitt der Blättchen und stark skulpturierte Früchtchen abzuweichen.' But later Handel-Mazzetti (1939) and Li (1951) failed to rightly recognize *D. formosana*, reducing it merely to a synonym of *D. indica*. Recently Kitamura treated the plant B as a variety of *D. indica* without expressing his opinion on the plant A (*D. major*) of Japan.

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The plant A is generally found in open woods or on shady hill-sides, while the plant B often on sunny road-sides or on cultivated grounds. Under favourable conditions, the plant A grows much larger having deep green elongate leaflets, and is easily recognizable even under a sterile condition in the field. On sunny barren grounds, however, it is difficult to distinguish the plant A from B in size, because the former becomes smaller with small lighter green leaves and small fruits. As compared with A, the plant B tends to have thinner roundish leaflets with deeper obtuse double teeth, reflexed fruiting calyx-lobes, and softer hairs. The amount of hairs, and the shape of petals, calyx-lobes and calycules are apt to vary in both plants. The most stable outer morphological characters in separating the two plants lie in fruiting receptacles and achenes (cf. Figs. 1 & 2).

According to Ikuse (1956), the pollen grains of the plant B are 21–22 $\mu \times$ 23–24 μ in size, whereas those of A are larger attaining 27 $\mu \times$ 29.5 μ. The stomata of the plant A is also larger statistically than those of the plant B. The length of stomata on the lower surface of leaves ranges from 25 μ to 33 μ in the former, and from 18 μ to 24 μ in the latter.

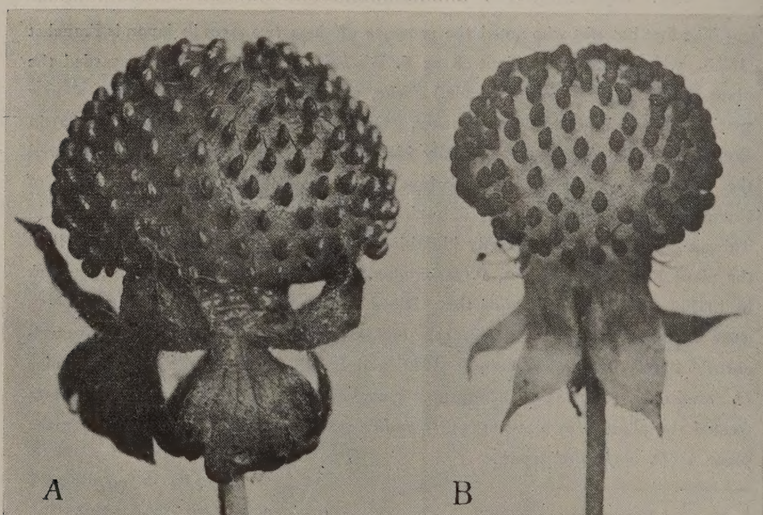


Fig. 1. Fruiting receptacles of (A) *Duchesnea indica* Focke (left) and (B) *D. chrysantha* Miquel (right). ×ca. 4. Photo by S. Watari.

Duchesnea indica planted in Mass., U. S. A. was cytologically studied by Ichijima in 1926, and was reported to have 42 gametic chromosomes. We have examined a plant cultivated at Paris under the name *D. indica*, and have confirmed

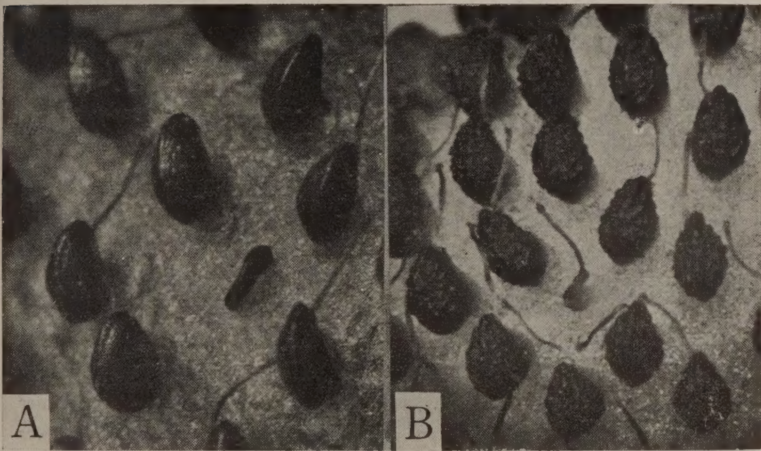


Fig. 2. Parts of fruiting receptacle of (A) *Duchesnea indica* (left) and (B) *D. chrysantha* (right). ×ca. 10. Photo by S. Watari.

that its somatic chromosomes are 84. So *D. indica* is considered to be dodecaploid, as the basic numbers of *Duchesnea* and its allied genera, *Potentilla* and *Fragaria*, are all 7. It became clear that the plant A collected at Kinugasa near Hikawa, and Yamatomachi in prov. Musashi, and Kanonzaki in prov. Sagami has also 2n=84 chromosomes.

On the other hand the plant B collected at Yamatomachi and Musashiranzan in prov. Musashi, Usui in prov. Shimôsa, and Mashiko & Fubasami in prov. Kodzuke was unexpectedly diploid, having 14 chromosomes in root-tip cells (Fig. 3, A). A form of the plant B with pure white fruiting receptacles and yellowish gray achenes was also diploid (Fig. 3, B).



Fig. 3. Somatic chromosomes of *Duchesnea chrysantha* (A), f. *leucocephala* (B), and a putative hybrid (C). ×ca. 1600.

It is noteworthy that the two collections from Minenoyakushi and Sengen-one of

the Tama district in prov. Musashi were proved by us to have 2n=49 chromosomes (Fig. 3, C). As they produce neither pollen grains nor fruits, this heptaploid seems to be a natural hybrid between the plants A and B, although it is nearer to the former in outer morphological characters. It is also probable that tetra-, hexa-, or octaploid is found in future in Japan, India, or elsewhere.

So far as our present knowledge is concerned, the plant A seems to be conspecific with *Duchesnea indica*, both being dodecaploid. Although the Indian specimens are mostly smaller than the Japanese ones, the original figure of Andrews which was based on a plant collected in north-east Bengal and cultivated in England, as well as some specimens from India and China such as Ichang, Hupeh (Henry, no. 3453), and Taipei Shan, Shensi (Leason 1910) are as large as *D. major* of Japan, and agree well with the latter in all respects. So *D. major* is regarded as a synonym of *D. indica* which is widely distributed from Afghanistan eastwards to Japan, and southwards to Java, and is naturalized in Europe and Americas.

For the diploid plant B, we here adopt the name *Duchesnea chrysantha* (Z. et M.) Miq. The type specimen of its basionym *Fragaria chrysantha* Zoll. et Mor., i.e. Zollinger no. 1987 from west Java, is extant neither in Dutch herbaria nor Genève, but in Zürich University, and we have examined the specimen which was kindly sent on loan. It consists of a plant with only one flower, but matches well with the plant B in various morphological characters. We have also confirmed by the courtesy of Mr. T. I. Chuang that the type specimen of *D. formosana* in National Taiwan University has tubercled achenes. If one wishes to treat this race as a variety, the correct name is *D. indica* var. *leucocephala* Makino. It occurs throughout Japan, Taiwan, southern China, Indo-China, and also in Java, Sumatra, and Philippines.

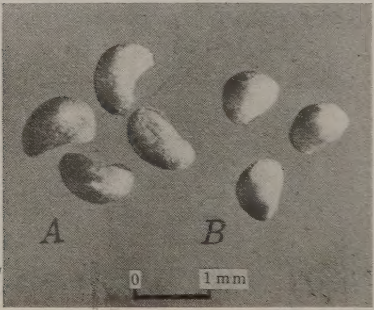


Fig. 4. Achenes from the types of (A) *Potentilla Wallichiana* Ser. (left) and (B) *P. denticulosa* Ser. (right).

Potentilla Wallichiana Seringe from Nepal, to which Franchet and Nakai once referred the plant B, has smaller smooth achenes, and *P. denticulosa* Seringe from Nepal also has similar small achenes (cf. Fig. 4). But it is still doubtful if their achenes are fully mature, and if they represent another race of *D. indica*. *Duchesnea*

sundaica Miquel and *Fragaria* (Duchesnea) *Filipendula* Hemsley do not belong to *Duchesnea* in a strict sense, and the former is a synonym of *Potentilla Kleiniana* Wight et Arnott, and the latter is *Potentilla Hemsleyana* Th. Wolf.

Under the present circumstances the *Duchesnea indica* group can be treated as follows:

(**A**) **Duchesnea indica** (Andr.) Focke in Engl. et Prantl, Pfl.-fam. **3**(3): 33 (1888)—Komarov, Fl. Mansh. **2**: 489 (1903)—Matsumura, Ind. Pl. Jap. **2**(2): 200 (1912), p.p.—Koidzumi, Consp. Rosac. Jap. 168 (1913), p.p.—Britton & Brown, Ill. Fl. ed. 2, **2**: 259 (1913)—Bailey, Stand. Cycl. Hort. **1**: 1080 (1914)—Cardot in Lecomte, Fl. Gén. Ind.-Chin. **2**: 650 (1920), p.p.—Hegi, Ill. Fl. Mitt.-Eur. **4**(2): 907, f. 1161 (1923)—Odashima in Journ. Soc. Trop. Agr. **7**: 80 (1935)—Juzepczuk in Fl. U.R.S.S. **10**: 67 (1941).

Fragaria indica Andrews, Bot. Repos. **7**: t. 479 (1807)—Wight, Icon. Pl. Ind. Or. **3**: t. 989 (1845)—Hooker f., Fl. Brit. Ind. **2**: 343 (1878)—Forbes et Hemsley, Enum. Pl. Chin. **1**: 240 (1887).

Duchesnea fragiformis J. E. Smith in Trans. Linn. Soc. **10**: 373 (1811), superfl.

Potentilla denticulosa Seringe in DC., Prodr. **2**: 573 (1825).

P. Wallichiana Seringe in DC., l.c. 574 (1825).

Fragaria malayana Roxburgh, Fl. Ind. ed. 2, **2**: 520 (1832).

F. Roxburghii Wight et Arnott, Prodr. Fl. Pen. Ind. **1**: 300 (1834), pro syn.

F. nilagirica Zenker, Pl. Ind. Dec. **1**: 7, t. 9 (1835).

Potentilla Durandii Torrey et Gray, Fl. N. Amer. **1**: 444 (1840).

Potentilla indica (Andr.) Th. Wolf in Ach. et Graebn., Syn. Mitt.-Eur. Fl. **6**: 661 (1904); in Bibl. Bot. **16** (Ht. 71): 664 (1908)—Hand.-Mzt., Symb. Sin. **7**: 517 (1933); in Act. Hort. Gotob. **13**: 320 (1939), p.p.

Duchesnea indica var. *β major* Makino in Bot. Mag. Tokyo **28**: 184 (1914).

D. major (Makino) Makino in Journ. Jap. Bot. **2**(5): 19 (1921); Ill. Fl. Jap. rev. ed. f. 1353 (1949)—Terazaki, Shokub. Dzukan f. 205 (1933)—Ohwi, Fl. Jap. 628 (1953)—Okuyama, Colour. Ill. Pl. Jap. **1**: 134, t. 66, f. 4 (1957).

Nom. Jap. Yabu-hebiichigo (Makino 1914).

(**B**) **Duchesnea chrysantha** (Z. et M.) Miquel, Fl. Ind. Bat. **1**: 372 (1855).

Fragaria chrysantha Zollinger et Moritzi, Syst. Verz. 7 (1846).

Fragaria indica β. Wallichii Franch. et Sav., Enum. Pl. Jap. **1**: 129 (1873), excl. syn. *Potentilla Wallichiana*.

Potentilla indica var. *Wallichii* (Fr. et Sav.) Wolf in Bibl. Bot. **16**: 666 (1908).

'*Duchesnea indica* Focke': Matsum., Ind. Pl. Jap. **2**(2): 200 (1912), p.p.—Koidzumi, l.c. (1913), p.p.—Makino in Bot. Mag. Tokyo **28**: 183 (1914), *α. typica* Makino; Ill. Fl. Jap. rev. ed. f. 1352 (1949)—Terazaki, Shokub. Dzukan f. 204 (1933)—Li in Lloydia **14**: 231 (1951), p.p.—Ohwi, Fl. Jap. 628 (1953).

'*D. Wallichiana* Nakai' ex Hara in Journ. Jap. Bot. **10**: 22 (1934), excl. basionym—Nakai in Bull. Sci. Mus. Tokyo **31**: 57 (1952).

D. formosana Odashima in Journ. Soc. Trop. Agr. **7**: 79 (1935).

D. indica var. *japonica* Kitamura in Act. Phytotax. Geobot. **15**: 160 (1954); Faun. & Fl. Nepal Himal. **1**: 148 in nota (1955).

D. indica var. *leucocephala* f. *japonica* (Kitam.) Midzushima in Misc. Rep. Res. Inst. Nat. Resour. **45**: 68 (1957).

Nom. Jap. Hebi-ichigo, Taiwan-hebiichigo (Odashima 1957).

f. **leucocephala** (Makino) Hara, comb. nov.

D. indica var. *leucocephala* Makino in Journ. Jap. Bot. **7**: 6 (1931).

D. Wallichiana f. *leucocephala* (Mak.) F. Maekawa ex Honda, Nom. Pl. Jap. 148 (1939), comb. nud.

We wish to express our sincere thanks to Dr. C. Baehni and Dr. S. Vautier in Conservatoire et Jardin Botaniques, Genève, Dr. F. Markgraf in Botanisches Museum der Universität Zürich, and Dr. C. G. G. J. van Steenis in Rijksherbarium, Leiden who kindly gave us valuable informations on the subject.

ヘビイチゴとヤブヘビイチゴの区別は牧野先生 (1914 & 21) が明かに指摘されて以来，日本では一般に認められている。しかしその学名については問題があり，*Duchesnea indica* (Andr.) Focke がヤブヘビイチゴであることに気付かれたのは中井先生で，ヘビイチゴの方は *D. Wallichiana* (Ser.) に当てられた。その後小田島氏は独立に台湾で2種の差異を認め，ヤブヘビイチゴにはふれずにその形をヘビイチゴ *D. indica* とよび，ヘビイチゴをタイワンヘビイチゴ *D. formosana* と名付けた。これらの見解はおのおの部分的に正しかつたが説明の不足から分り難い点もあつたので外国の学者にはほとんど理解されなかつた。私共も多年この問題に注意してきたが，ヤブヘビイチゴはやはり *D. indica* と同種であり，12 倍体植物であるとの結論に達した。この形は欧米に広く帰化している。インド産はやや小形のものが多いが今のところ別変種として区別するにも及ばないように思う。一方ヘビイチゴは *D. chrysantha* (Z. et. M.) Miq. で2倍体であり，その分布は日本のほか南支からマレイシアに及んでいる。なお学名，異名についての詳細は欧文欄を参照されたい。また多摩地方の峯の薬師下及び浅間尾根下で採集したものはヤブヘビイチゴに似ているが果実を作らずまた花粉もできず，染色体数は 49 (7 倍体) で，ヤブヘビイチゴとヘビイチゴの自然雑種と推定される。この外にも染色体数を異にする他系統のものが存在する可能性があり今後解決すべき問題が残つている。

Masami MIZUTANI* & Sinske HATTORI*: **On some little known species of *Lophocolea* (Hepaticae) from the Southern Hemisphere**

水谷正美*・服部新佐*: 南半球産 *Lophocolea* の疑問種二, 三について

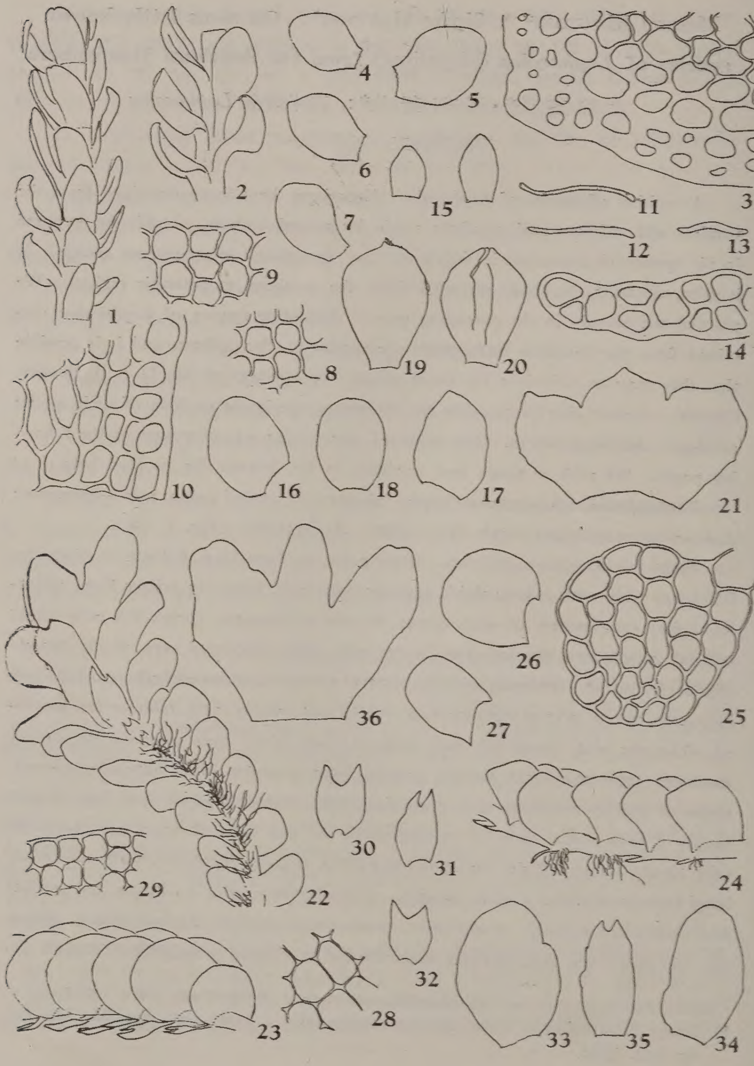
A number of species of *Lophocolea* (Hepaticae) have been described from the tropical and southern regions of the world by several authors, notably by Stephani in his Species Hepaticarum in which we may find many heterogeneous groups. It is true, at least, in those recorded from the southern to antarctic regions. We pointed out already in the preceding paper[1] that some species of *Lophocolea* described from the Southern Hemisphere are similar to *Pachyglossa*, and it is possible that they may be united to the latter genus. By courtesy of Dr. C. E. B. Bonner, Genève, we were able to examine the schizotype specimens on loan of such species as *Lophocolea azopardana*. The result of our studies was expressed in the following pages. We wish to thank here cordially to Dr. Bonner for his kind help.

Pachyglossa azopardana (Steph.) Mizutani et Hattori comb. nov.—Basionym: *Lophocolea azopardana* Steph. Spec. Hepat. **3**: 54 (1906). Fig. I, 1–21.

Plants rigid, brown in mats. Stem erect, to 2 cm long, 0.2 mm in diameter, 0.8–1 mm wide with leaves, rigid, sparsely branched, branches arising from underleaf-axils; cross-section of stem about 10 cells in diameter, cortex 2–3 cells thick, cortical cells much smaller than inner cells, walls thickened very much, brown, trigones indistinct. Rhizoids not seen. Leaves alternate, transversely, inserted, loosely imbricate, nearly in rows together with underleaves, nearly erect, more or less incurved, obliquely oval, about 0.75 mm long, 0.5 mm wide, apex rounded or obtuse, narrowed (and somewhat falcate) toward base, margins often narrowly reflexed, entire or slightly crenulate with projecting cells; cross-section of leaf base linear, mostly 2 cells thick, ditto of middle partly so, and ditto of upper part 1-celled; cells 10–15μ along margin, about 15μ at middle, trigones indistinct, walls thickened, basal cells to $40\times20\mu$, cuticle smooth. Underleaves similar to leaves, but smaller and nearly symmetrical, nearly erect, transversely inserted, ligulate-oblong, almost flat, about 0.5 mm long, 0.3 mm wide, obtuse or slightly emarginate. Female in-

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1) *Pachyglossa tristicha* Herz. and its relationships. Journ. Jap. Bot. **33**: 359–363. fig. 1–2. 1958.


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florescence terminal, usually with single innovation; bracts larger than leaves, oval, 0.75 mm long, 0.6 mm wide, apex nearly rounded, more or less hyaline, bracteole quite similar to bracts, 0.7 mm long, 0.55 mm wide, apex rounded or slightly emarginate. Perianth almost pyriform *in situ*, 1 mm long, 0.7 mm wide, strongly triplicate, plicae rounded (not sharp), 2 lateral and 1 dorsal, apex 3-lipped 1/4 to 1/3, lips subtriangular, usually apiculate, margin mostly hyaline; archegonia about 10 per perianth, flask-shaped. Male inflorescence not seen. (The description was made from the type specimen except the female inflorescence which was based on *Dusen 233*).

Specim. exam. Tierra del Fuego: Azopardo en rivulis frigidis, 600 m, *Dusen 121*-type. Insula Desolacion: Puerto Angosto, ca. 600 m, *Dusen 233*, April 1, 1896; ad rivul. ca. 250 m, *Dusen 178*, March 29, 1896. Südgeorgien, *Skottsberg 9*. All specimens in Herb. G.

The type syecimen agrees well Stephani's original description and the figures in his unpublished Icones Hepaticarum. It seems to be hygro- or hydrophilous, because of numerous diatomes are attached to the plant body. Dusen's collection no. 233 has leaves which are more rounded and more or less thinner than the type, and are not crenulate. Dusen no. 178 is more rigid but smaller, and its leaves are much denser, nearly symmetrical and almost hyaline along the margin whose cells are much thickened. In Skottsberg's collection no. 9 only a single stem was found in a mat of *Andreaea*. It appears to be similar to Dusen no. 233, but we were unable to study to our satisfaction. We regarded, however, all the above-mentioned differences are due to habitat modifications in one and same species.

We propose here a new combination for the present species, based on the following characters:

(1) Leaves and underleaves are quite similar in shape, both transversely inserted

Fig. I. 1-21. *Pachyglossa azopardana* (Steph.) Mizut. et Hatt.

1. Part of branch, ventral view, ×18. 2. Do., dorsal v., ×18. 3. Cross-section of stem, ×360. 4-7. Leaves, ×18. 8. Middle cells of leaf, ×360. 9. Apex of leaf, ×360. 10. Base of leaf, ×360. 11-13. Cross-sections of leaf (11, middle part; 12, lower part; 13, basal part), ×30. 14. Part of 13, ×360. 15. Underleaves, ×18. 16, 17. Female bracts, ×18. 18. Female bracteole, ×18. 19. Perianth, ventral view, ×18. 20. Do., dorsal v., ×18. 21. Do., dissected out, ×18.

22-26. *Lophocolea flavo-virens* Steph.

22. Plant with perianth, ventral view, ×18. 23, 24. Parts of branch, lateral v., ×18. 25. Cross-section of stem, ×230. 26, 27. Leaves, ×18. 28. Middle cells of leaf, ×230. 29. Apex of leaf, ×230. 30-32. Underleaves, ×18. 33, 34. Female bracts, ×18. 35. Female bracteole, ×18. 36. Perianth dissected out, ×18.

Figures 1-15 were drawn from the type specimen, 16-21 from Dusen 178, 22-36 from the type specimen of *L. flavo-virens*; all drawn by M. Mizutani.

and erect to erect-patent; (2) the middle～basal portion of leaves is mostly 2-celled in thickness; (3) cortex is well differentiated, the cell walls much thickened and brown in colour; (4) branches arise from the underleaf-axil; (5) plants are erect, rigid and brown-coloured; (6) perianths are different in shape and not sharply keeled; and (7) rhizoids are not seen.

However, compared to *Pachyglossa tristicha*, the present species shows less isophylly; that is, the underleaves are much smaller than the leaves. The cross-section of leaves of *P. tristicha* is 2 cells thich throughout, whereas in the present species 1 cell thick, except from the middle to base of leaves. Stephani (1906) remarked, "Die Pflanze steht der *L. Boveana* sehr nahe und wurde auch s. Zt. so bekannt; die Zellgrösse weicht aber wesentlich ab.", and for the habitat he described, "Fuegia, Azopardo (Dusen), Insula Desolacion (Dusen)." *Lophocolea boveana* Mass. which was recorded from Fuegia was not available for our examination.

Lophocolea flavo-virens Steph. Spec. Hepat. **6**: 272 (1922). Fig. I, 22–36.

Plants small, flaccid, pale olive to brown. Stem creeping with ascending apex, to 2 cm long, 0.1 mm in diameter, about 1 mm wide with leaves, barely branched; cross-section of stem nearly rounded, 6–7 cells thick, cortical and inner cells hardly differentiated, walls somewhat thick, trigones absent. Rhizoids more or less brownish, rather numerous on underleaf-bases. Leaves succubous, densely imbricate or rarely distant, slightly convex, erect-patent or often horizontal, insertion embracing nearly half of stem, decurrent dorsally, wide ligulate or nearly rounded, 0.6–0.9 mm long, 0.5–0.8 mm wide, margin entire, apex truncate or rotundate: apical cells about 15μ, middle cells 15–30×15–20μ, walls more or less thickened, trigones indistinct, basal cells to 50×35μ, cuticle smooth. Underleaves contiguate or distant, erect to erect-patent, oblong, to 0.55 mm long, 0.4 mm wide, but mostly far smaller, 2-lobed to about 1/3, lobes triangular, acute, margin entire, sinus acute or rounded. Female inflorescence terminal; bracts longer than leaves, oblong-elliptical, to 1.2 mm long, 0.85 mm wide, ventral margin often with sharp sinus, apex rounded; bracteole ligulate, 1 mm long, 0.45 mm wide, bilobed to 1/8, teeth triangular, acute, lateral margin often with 1–3 minute teeth. Perianth somewhat similar to a lily flower with 3 lobes, indistinctly 3-keeled, mouth deeply trilobed, lobes ligulate with truncate or retuse apex.

Specim. exam. Patagonia: Huafo, *Skottberg 581*-type in Herb. G.

The perianth of this species is very distinctive, and the leaves are round and mostly erect-patent. It seems to differ much from the typical northern members

of *Lophocolea* and rather heterogeneous. It has been known so far only from the type collection.

Lophocolea austrigena Tayl. Tayl. in Gott., Lindenb. et Nees, Synop. Hepat. 702 (1847); Steph. Spec. Hepat. **3**: 57 (1906). Syn. *Jungermannia austrigena* Tayl. London Jour. Bot. **3**: 466 (1844).—*J. cavispina* Tayl. loc. cit. 463; Gott., Lindenb. et Nees, Synop. Hepat. 670 (1847); Steph. loc. cit., pro syn. Fig. II, 1–8.

Plants large, brownish green. Stems to 4 cm long, 0.4 mm in diameter, brown, nearly erect, rigid, 1 mm wide and 3 mm high with laterally appressed leaves.

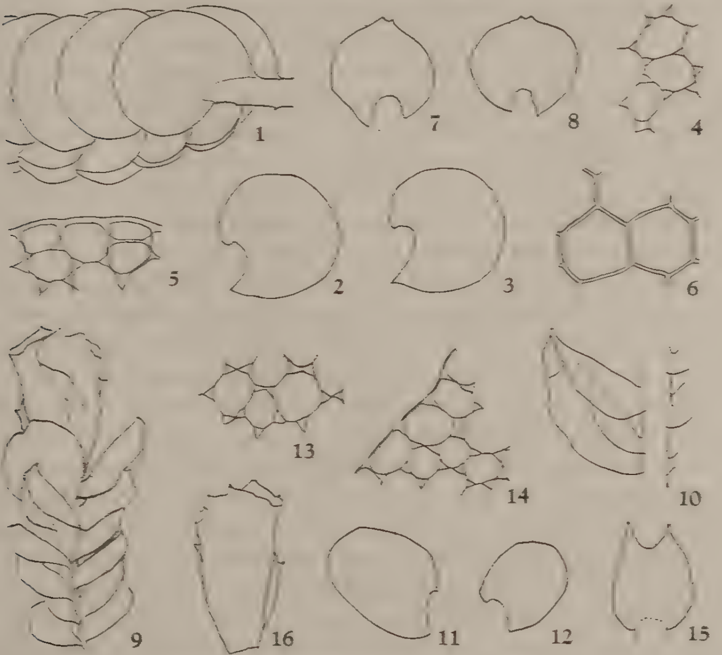


Fig. II. 1-8. *Lophocolea austrigena* (Tayl.) Tayl.
1. Part of stem, lateral view, ×10. 2, 3. Leaves, ×10. 4. Middle cells of leaf, ×230. 5. Apex of leaf, ×230. 6. Basal cells of leaf, ×230. 7, 8. Underleaves, ×10.
9-16. *Lophocolea novae-zelandiae* (L. et L.) Nees
9. Plant with perianth, dorsal view, ×10. 10. Part of branch, underleaves dissected away, ventral view, ×15. 11, 12. Leaves, ×15. 13. Middle cells of leaf, ×360. 14. Apex of leaf, ×360. 15. Underleaf, ×30. 16. Perianth, ventral view, ×10.
All figures were drawn by M. Mizutani from the type specimens.

branches few, mostly arising from leaf-axils. Rhizoids not seen. Leaves succubous, densely imbricate, strongly erect-appressed, rather flat, nearly round, about 1.5 mm long, 2 mm wide, dorsally decurrent with sinuate, oblique insertion; cells 20–35×15–20μ along margin and at middle, walls thick, trigones rather large, acute, basal cells to 70×40μ, trigones indistinct; uticle smooth. Underleaves suberect, imbricate, strongly concave (nearly folded longitudinally), nearly round, about 1.2 mm long, 1.7 mm wide, apex usually bitoothed, teeth small, insertion to stem deeply sinuate.

Specim. exam. Hermite Island, *Hooker*, type in Herb. G.

Only a single sterile shoot was at our disposal. However, Stephani described, "Folia floralia caulinis simillima, multo majora; amphigastrium florale intim. caulinis haud diversum majus tamen et semper integerrimum; perianthia magna longe exserta oblonga triquetra ore truncato repando plicatulo integerrimo." This species resembles the preceding, but is distinguished by the shape of perianths and underleaves. As for the range of it, Stephani (1906) enumerated "Fretum magellanicum (Hooker, Hariot, Dusen); Falklands Islands (Hooker)."

Lophocolea novae-zelandiae (L. et L.) Nees in Gott., Lindenb. et Nees, Synop. Hepat. 168 (1844); Steph. Spec. Hepat. **3**: 112 (1906). Syn. *Jungermannia novae-zelandiae* L. et L. in Lehm. Pugillus Plant. **6**: 33 (1834).—*Jungermannia grisea* Tayl. London Jour. Bot. **3**: 379 (1844). *Lophocolea grisea* Tayl. in Gott. Lindenb. et Nees, Synop. Hepat. 169 (1845).—*Jungermannia subintegra* Tayl. London Jour. Bot. **3**: 477 (1844). *Lejeunea subintegra* Tayl. in Gott. Lindenb. et Ness, Synop. Hepat. 376 (1845). Fig. II, 9–16.

Plants greenish brown. Stems rigid, erect or ascending, to 12 mm long, 0.2 mm in diameter, 1.7 mm wide with leaves, scarcely branched; cross-section of stem elliptical, about 7 cells thick, cortical and inner cells hardly differentiated, walls somewhat thick, trigones indistinct. Rhizoids rather numerous below, more or less brownish. Leaves succubous, densely imbricate, subpposite, erect-patent, nearly flat or slightly decurved, obliquely inserted, line of insertion deeply sinuate, decurrent dorsally, both dorsal and ventral margins decurved, nearly round or oblong-oval, 0.7–0.9 mm long, 0.6–0.7 mm wide, apex rounded; cells 8–15μ at apex and along margin, 10–25×10–20μ at middle, walls thin, trigones large, acute, basal cells to 40×30μ; cuticle smooth. Underleaves sinuately inserted, 2–3 times wider than stem, oblong-oval, to 0.45 mm long and 0.4 mm wide, flat or slightly reflexed, margin entire, bilobed to 1/4, lobes triangular, acuminate, sinus rounded. Female

inflorescence terminal: bracts oval, entire, but often emarginate at apex, 1.5 mm long, 1.2 mm wide. Perianths oblong-obovate, mouth wide, truncate-trilobed, lobes short, irregularly angular or toothed, teeth obtuse and short, triplicate, 2 lateral, 1 dorsal, wing shot, narrow and often with tooth near apex.

Specim. exam. New Zealand: Dusky Bay, *Menzies*, type in Herb. G.; Stewart Island, Port Pegasus, Pegasus Creek, on lip of waterfall at sea level, occurring with *Pachyglossa tristicha*, Aug. 1, 1949, *W. Martin* 530 in Herb. NICH. Falklands Islands, *J. D. Hooker*, type of *Jungermannia subintegra* Tayl. in Herb. G.; from Herb. *Taylor*, type of *Lophocolea grisea* β in Herb. G.

Only a single shoot with a perianth was at our disposal, and bracteole and almost all of underleaves had been dissected away and lost. The present species resembles the preceding two, but its perianth is most characteristic of *Lophocolea*, having the sharp and winged keel with a tooth and the angular or shortly toothed lobes.

Stephani (1906) cited, for the localities, "Hab. New Zealand (Menzies), Falklands Isles (Hooker, Lyall), Fretum magellan. (Hooker, Spegazzini, Hariot)", and remarked, "Hierher gehören wahlscheinlich nach Mitten folgende als steril bekannte Arten: *Lopho. grisea* Taylor Syn. Hep. p. 169, *Lopho. rivalis* Taylor ibid. p. 701, *Lopho. sabuletorum* Hooker ibid. p. 697 *Jung. subintegra* Tayl. J. of Bot. 1844 p. 477, *Lejeunea subintegra* Taylor Syn. Hep. p.376, *Lopho. subviridis* Tayl. Syn. Hep. p. 699." We were able to examine the schizotype specimens of *L. grisea* and *Jungermannia subintegra*. These two species are quite similar and are considered to be of the same taxon. They lack perianths, and differ from *L. novae-zelandiae* in having narrower underleaves and nearly flat, distant and not so rigid leaves. However, this species is very plastic, and such differences should be regarded as habitat modifications, possibly growing in water or very wet sites.

Addendum. After the manuscript was prepared, we received from Dr. R. Grolle (Jena) a reprint of the paper: Th. Herzog and R. Grolle, Was ist *Pachyglossa*? (Rev. Bryol. Lichenol. **27**: 147–165. fig. 1–V. 1958), in which they described 3 species of *Pachyglossa*, and reduced *P. tristicha* Herz. to a synonym of *P. tenacifolia* (Hook.) c. n. (=*Jungermannia tenacifolia* Hook. 1847) and *Lophocolea leopardana* Steph. to that of *P. spegazziniana* (Mass.) c. n. (=*Lophocolea spegazziniana* Mass. 1885) respectively. Their paper deals with a number of little known southern species of *Lophocolea* and *Herpocladium*, including many useful comments and important criticism, and should be highly appreciated.

Syo KUROKAWA*: **Anaptychiae lichens and their allies of Japan (2)****

(with 2 plates)

黒川 逍*: 日本産ゲジゲジゴケ属地衣 (2)**

2. **Anaptychia speciosa** (Wulf.) Massalongo, Memor. Lichenogr. 36 (1853); Lynge in Videnskaps. I. Mat.-Naturv. Kl. **8**: 12 (1916).

var. **speciosa**

Lichen speciosus Wulf. in Jacq. Collect. Bot. **3**: 119 (1789).—*Parmelia speciosa* Ach., Meth. Lich. 198 (1803).—*Physcia speciosa* Nyl., Prodr. Lich. Gall. Actes Soc. Linn. Bord. 307 (1857) et Syn. Lich. 416 (1858–60).

Thallus plagas usque ad 10 cm latas formans, laciniatus, laciniis elongatis et linearibus, 0.7~2 mm latis, 0.2~0.3 mm crassis, in apicibus laciniarum lateralium brevium saepe soraliis capitatis praeditis.

Hymenium 130~200 μ altum, J-coerulescens; excipulum proprium una cum hypothecio 30~60 μ altum; sporae fusco-brunnescentes, ellipsoideae, 28 (30~37)×14~18 μ magnae.

Reaction: thallus K-yellow; med. K-yellow, CaCl-, PD=pale yellow.

Chem. ingr.: atranorine, zeorin and undetermined substance (identical with that of *A. hypoleuca*).

Hab.: on bark of trees and rarely among mosses on rocks.

Distr.: Europe.

Exsicc. exam.: Rabenhorst, Lichenes Europaei no. 908 (in A[1]).

Specim. exam.: Germany: Baiern, Oberammergau (Aug., 1893, & Aug. 1894, Schnabl); Allgäu, Oberstdorf (July 1895, Lösch); Baiern, Bäumen (1865, W. Baur); Eibsee (1897, Vaykruger); Kärnten, Knoten 1,000 m (1897, Simmer); Heiderberg (June 1857, W. Ahles); Bern (1894, Kemmler). Austria: Tyrol (Aug. 10, 1897, Arnold) (all in A).

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** 資源科学研究所業績第 929.

1) The herbarium abbreviations used in this paper are as follows: A—private herbarium of Dr. Y. Asahina, Tokyo; I—private herbarium of Mr. Y. Ikoma, Tottori City; K—private herbarium of the author, Tokyo; KU—herbarium of Kyoto University, Kyoto; M—herbarium of National Science Museum, Tokyo; T—herbarium of University of Tokyo, Tokyo; Ta—private herbarium of Mr. Y. Tanaka, Nara Pref.; US—U. S. National Herbarium, Smithsonian Institution, Washington; Y—private herbarium of Mr. I. Yoshimura, Kochi Pref.

var. **microspora** Kurokawa var. nov.

Anaptychia hypoleuca var. *sorediifera* non Vain. Sato in Bull. Biogeogr. Soc. Jap. **6**: 115 1936 pr. maj. p.—*Anaptychia speciosa* non Mass. Räsänen in Journ. Jap. Bot. **16**: 139 1940.

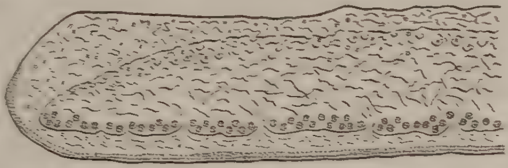


Fig. 8. Transverse section of thallus of *A. speciosa* var. *microspora* (×100).

Thallus cinerascens vel albido-glaucescens, plagas ad 10 cm latas formans, substrato laxe adnatus, laciniatus; laciniae vulgo elongatae et lineares, margo integris vel subintegris, crebre dichotome aut partim subdigitatim divisae, contiguae vel subimbricatae, rarius peripheriam versus subdiscretae, superne planae vel leviter convexae, 0.7~2 mm latae et 0.2~0.3 mm crassae, vulgo utrinque corticatae, in apicibus laciniarum lateralium brevium saepe soraliis capitatis praeditae; subtus albidae vel centrum versus leviter fuscae; in marginibus rhizinis thallo concoloribus vel apices versus obfuscatis et irregulariter divisis ornatae.

Cortex superior aequaliter vel subaequaliter incrassatus, 50~100μ crassus, ex hyphis parallelibus formatus, parte exteriore obscure cinerea, 15~20μ crassa, parte inferiore decolore; stratum gonidiale sub cortice superiore praeditum, continuum, 25~50μ crassum, gonidiis 6~9μ diam.; stratum medullare ex hyphis intricatis formatum, ca. 100μ crassum; cortex inferior ca. 25μ vel usque ad 40μ crassus, ad apices versus saepe tenuissimus et rarius partim deficiens, omnino incoloratus vel parte exteriore plus minus obscuratus.

Apothecia 2~5 mm lata, discis fusco-brunnescentibus, epruinosis, marginibus integris vel crenatis; receptaculum thallo concolor, laevigatum. Hymenium 100~130μ altum, J—coerulescens; epithecium fuscum vel fusco-brunnescens; excipulum proprium una cum hypothecio ca. 30μ altum; cortex receptaculi subaequaliter incrassatus; paraphyses in apicibus parum incrassatae, simplices, eseptatae; asci subclavati, 8-spori; sporae fuscescentes vel fusco-brunnescentes, ellipsoideae, apice rotundatae, medio non aut levissime constrictae, 1-septatae, 2-loculares, loculis rotundatis vel subtriangularibus, 23~31×11~16μ magnae.

Reaction: thallus K—yellow; med. K—yellow, CaCl—, PD—pale yellow.

Chem. ingr.: atranorine, zeorin and undetermined substance identical with

that of *A. hypoleuca*).

Hab.: on bark of trees.

Jap. name: yama-gezigezigoke.

Distr.: North America, Manchuria, Korea, Saghalien and northern Japan.

Exsicc. exam.: Tuckerman, Lichenes Amer. Septentr. no. 81 (—holotype in A).

Specim. exam.: Manchuria: Hinko-syo (浜江省), Syorei (小嶺) (June 14, 1942, S. Asahina in A). Korea: Mt. Hakutosan (白頭山), ca. 700 m (Nov. 16, 1938, G. Adachi in A). Saghalien: Aikawa (July 22, 1932, Y. A. in A); Tinnai (Aug. 14, 1933, M. Sato, Karahuto no. 200 in T). Japan: Honsyu. Prov. Uzen: Mt. Gassan (Aug. 25, 1932, M. Sato, Tohoku no. 384, in T). Prov. Sinano: Mt. Yatugatake (Aug. 4, 1916, A. Yasuda no. 383, in T).

European specimens of the present species have linear and elongated laciniae and capitate soraliae at the apices of short branches of laciniae, and the spores are usually 30～37×14～18μ in size as observed by Lynge in Norwegian plants. On the contrary the specimens from North America and Saghalien, resembling European ones in the habitus and form of the thallus, have smaller spores (21～30×10～15μ). And the hymenium is also lower than those of European specimens, correlating with spore size. So I ventured to separate the lichens with smaller spores as var. *microspora* from typical plants of Europe, because the former probably belongs to a different geographical race. Northern Japanese representatives are unfortunately sterile, but they should be referred to this variety.

3. **Anaptychia pseudospeciosa** Kurokawa sp. nov.

var. **pseudospeciosa** f. **pseudospeciosa**

Anaptychia corallophora (non Vain.) Zahlbr. in Fedde Repert. **33**: 68 (1933); Sato in Journ. Jap. Bot. **12**: 426 (1936).

Thallus cinereus vel cinereo-glaucescens, plagas ca. 5 cm latas formans, laciniatus; laciniae sat crebre di- vel trichotome divisae, breves, neque elongatae, nec lineares, vulgo subimbricatae, 0.7～1.5 mm latae et 0.2～0.3 mm crassae, utrinque corticatae, in apicibus laciniarum lateralium brevissimarum soraliis capitatis praeditae, soraliis demum saepe confluentibus et pulvinatis; subtus albidae, leviter brunnescentes vel fusco-brunnescentes; margine et subtus rhizinosae, rhizinis brevibus, pallidis vel obfuscatis, saepe simplicibus aut demum irregulariter divisis.

Cortex superior aequaliter vel subaequaliter incrassatus, 50～120μ crassus, ex hyphis parallelibus formatus, parte exteriore obscure cinerea, ca. 15μ crassa; stratum gonidiale sub cortice superiore praeditum, continuum, ca. 25μ crassum, goni-

diis ca. 8μ diam.; stratum medullare 60~80μ crassum: cortex inferior 25~40μ crassus, sed apices versus saepe tenuissimus et rarius partim deficiens.

Apothecia rarissima, 1~3 mm lata, discis fusco-brunnescentibus, epruinosis, marginibus primum integris vel subcrenatis sed mox sat sorediosis. Hymenium 100 ~130μ altum, J+coerulescens; epithecium brunnescens: excipulum proprium una cum hypothecio 30~40μ altum: paraphyses filiformes, in apicibus parum incrassatae, simplices, eseptatae: asci subclavati, 100~120×20~25μ magni, 8-spori: sporae fusco-brunnescentes, ellipsoideae, apice rotundatae, medio non aut levissime constrictae, 1-septatae, 2-loculares, loculis rotundatis vel subrotundatis, 26~32×12 ~14μ magnae.

Reaction: thallus K+yellow: med. K—yellow afterwards reddish yellow, CaCl—, PD+yellow.

Chem. ingr.: atranorine, zeorin, norstictic acid, salazinic acid and undetermined substance (identical with that of *A. hypoleuca*).

Hab.: on rocks and rarely on bark of trees.

Distr.: Japan (Honsyu, Sikoku, Kyusyu), Formosa and India.

Jap. name: yama-gezigezigoke-modoki.

Exsicc. exam.: Lich. Jap. Exsicc. no. 203 —holotype in A and isotype in M, K and US).

Specim. exam.: Japan: Honsyu. Prov. Kozuke: Seta-gun, Kosakasi A. Tunoda, in M. Prov. Musasi: Titibu, Mitumine, Mt. Myoho 1.300 m S. K. 56146, in K: Totimoto S. K. 50327, in K; Arakawa-mura, Siroku 400 m S. K. 56110, 56111 and 56112, all in K: Mt. Mitake S. K. 50112, in K. Prov. Owari: Inuyama Y. A. in A. Prov. Ise: Taki-gun, Oosugi-dani Y. Tanaka, in Ta. Prov. Yamato: Mt. Oodaigahara, fertile! Y. Tanaka, in Ta. Prov. Settu: Arima-gun, Dozyo-mura M. Togashi, in A. Prov. Tanba: Taki-gun, Ooyama-mura Y. A. in A. Prov. Aki: Isl. Ituku-sima, Mt. Misen Y. Ikoma 3069, in I. Sikoku. Prov. Tosa: Takaoka-gun, Togano-mura, Mt. Kokuzo I. Yoshimura 957, in Y: Takaoka-gun, Bandagamori H. Matumoto, in Y: Tosa-gun, Tosayama-mura, Zyo I. Yoshimura 1152, in K and Y. Kyusyu. Isl. Yakusima: Kosugi-dani M. Omura, in A. Formosa: Raisha Jan. 4, 1926, Y. A. Taiwan no. 106, fertile! in A. India: Madura (South India), Palni Hills May 18, 1906, Rev. Fr. Leigh in K.

This new species has formerly been confounded with *A. speciosa*, but it is distinguished from the latter by chemical ingredients. When the Ac. X. of the present species is treated with KOH+K_2CO_3 in the cold, first of all, fine red nee-

dles of the potassium norstictate complex appear, spreading gradually over the whole sight field. Then after a while, the X shaped crystal aggregates of thicker prisms of potassium salazinate complex are observed. Morphologically it differs from *A. speciosa* in having short and non-linear laciniae. Moreover *A. speciosa* is considered as circumpolar lichen, whereas the present species seems to be tropical or subtropical one. The type material is unfortunately sterile, and the description of apothecia is taken from the specimen collected in Formosa by Y. Asahina (Taiwan no. 106).

f. **Tagawae** Kurokawa f. nov.

Thallus laciniis centrum versus ad margines microphyllino dissectis, divisionibus angustissimis, subascendentibus, in apicibus laciniarum et divisionum saepe soraliis ornatus. Ceterum ut in planta typica.

Distr.: Japan (Honsyu).

Specim. exam.: Honsyu. Prov. Yamato: Mt. Tonomine, on mossy rocks (Nov. 16, 1952, M. Tagawa no. 176—holotype in KU and isotype in K).

var. **inactiva** Kurokawa var. nov.

Physcia speciosa (non Nyl.) Nyl., Lich. Jap. 32 (1890) pr. p.; Müll. Arg. in Nuov. Giorn. Bot. Ital. **23**: 123 (1891)—*Anaptychia speciosa* (non Mass.) Zahlbr. in Bot. Mag. Tokyo **41**: 364 (1927).

Statura thalli ut in planta typica, sed differt ab ea nec acidum norsticuticum nec acidum salazinicum continente.

Reaction: thallus K+yellow; med. K+yellow, CaCl−, PD±pale yellow.

Chem. ingr.: atranorine, zeorin and undetermined substance (identical with that of *A. pypoleuca*).

Hab.: on rocks and rarely on bark of trees.

Distr.: Japan (Honsyu, Sikoku, Kyusyu), North and Central America, Hawaii, and Java.

Specim. exam.: Japan. Honsyu. Prov. Musasi: Titibu, east valley of River Ootigawa (S. K. 510182, in K). Prov. Sinano: Mt. Norikura (Y. A. in A); Lakeside of Sirakaba (M. Togashi, in A). Prov. Kai: Mt. Sitimen (Y. A. 162, in A). Prov. Izu: Amagi-Pass, Suisyoti (Aug. 20, 1956, Y. A. -holotype in A and isotype in K, M and US). Prov. Mikawa: Mt. Horaizi (S. K. 56026-b, in K). Prov. Yamasiro: Kihune (Y. A. in A). Prov. Yamato: Yosino-gun, Kawakami-mura, Kasiwagi (Y. Tanaka 323, in Ta); Uda-gun, Ukasi-mura, Iwahasi (M. Tawawa 120 and 103, both in KU). Prov. Settu: Misima-gun, Simamoto-mati, Syakudai (S. K.

57257, in K ; Kobe city, Nunobiki 250 m T. Suzuki, in K . Prov. Tanba : Kasiwabara-mati, Kanegasaka M. Togashi, in A. Prov. Inaba : Yazu-gun, Oo-mura Y. Ikoma 2473, in A and I ; Tottori city, Mt. Hisamatu Y. Ikoma 3080 and 3101-b, both in I . Sikoku. Prov. Iyo : Arai-gun, Kakuno-mati K. Oti, in A ; Kakuno-mati, Tonaru K. Oti, in A . Prov. Tosa : Agawa-gun, Nanokawa-mura I. Yoshimura 712, in Y . Kyusyu. Prov. Buzen : Simoge-gun, Sinyabakei, Kanbara Y. A. in A . North America. New Jersey : Greenbank St. Forest, Burlington Co. M. E. Hale 15337, in K . Central America. Costa Rica : Prov. de Cartago, Vicinity of Pejivalle 900 m Paul C. Standley and Juvenal Valerio 46721 and 46729, in US . Chiriqui Panama : Llano del Volcano P. F. Scholander, in US . Hawaii. Oahu, Kalihi Faurie 1071, in KU . Java. Prov. Batavia : In monte Megamendong 880 m V. Schiffner, Iter Indicum 1893 94 no. 3348, in A .

This new variety is externally identical with the typical plant, from which it is distinguished by the different chemical constituents. On the other hand from a closely related species, *A. speciosa* it is distinguishable in having short and non linear laciniae. The present variety seems to be widely distributed in tropical and subtropical zones, and in Japan it occurs from Kyusyu to Kanto district of Honsyu.

The geographical distribution of *A. speciosa* group should be investigated more exactly. But studies based on literatures alone are insufficient, for many authors do not distinguish between *A. speciosa* and *A. pseudospeciosa*, and there also many incorrect determinations of *A. speciosa*, *A. hypoleuca* and *A. sorediifera*.

4. **Anaptychia esorediata** Vain. DR. et Lynge in Lynge in Videnskaps. I. Mat.-Naturv. Kl. **16** : 14 (1924).

f. **esorediata**

Anaptychia speciosa var. *esorediata* Vain., Lich. Cat. Welw. Afr. Pl. **2** : 409 (1901) et Lich. Ins. Philipp. **2** : 107 (1913); Zahlbr. in Bot. Mag. Tokyo **41** : 364 (1927); Sato, Index Plant. Nipp. IV Lichenes 9 (1943)—*Anaptychia speciosa* f. *compactior* Zahlbr. in Bot. Mag. Tokyo **41** :

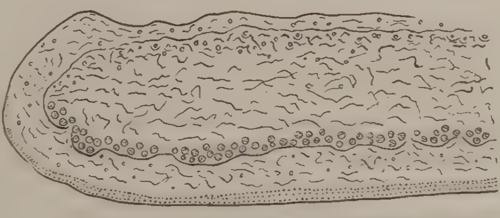


Fig. 7. Transverse section of thallus of *A. esorediata* (×100).

364 (1927); Asahina in Journ. Jap. Bot. **15**: 278 (1939)—*Chaudhuria indica* Zahlbr. in Annal. Mycol. **30**: 433 (1932).

Reaction: thallus K+yellow; med. K+yellow, CaCl−, PD±pale yellow.

Chem. ingr.: atranorine, zeorin and undetermined substance (identical with that of *A. hypoleuca*).

Hab.: on rocks and on bark of trees.

Distr.: Japan, Central and South America, Africa, India, Java, Siam, Indo-China, Philippine and China.

Jap. name: oo-gezigezigoke (new).

Exsicc. exam.: Zahlbruckner et Redinger, Lich. Rariores Exsicc. nos. 313 and 360.

Externally this species resembles *A. hypoleuca* var. *hypoleuca* f. *hypoleuca*, from which it differs in having the cortical layer on the undersurface of laciniae. In transverse section of the laciniae the upper cortex of the present species is equally or subequally thickened, although that of *A. hypoleuca* has distinctly irregular thickness. Many earlier lichenologists have considered this lichen to be only a variety of *A. speciosa*, but I agree with Lynge's opinion in regarding it as a proper species. A full description is given by Lynge (ibid.) and my observation agrees very well with it. The present species seems to be closely related to *A. isidiophora* rather than *A. speciosa* in external appearances and distribution range.

f. **subimbricata** Räsänen in Journ. Jap. Bot. **16**: 139 (1940).

A. speciosa var. *esorediata* f. *subimbricata* Sato, Index Plant. Nipp. IV Lichenes 9 et 115 (1943).

Laciniae centrum versus lacinulis secondariis instructae, lacinulis subimbricatis, brevibus, thallo concoloribus, in apicibus rotundatis. Ceterum ut in planta typica.

Distr.: Japan and China.

The present form is distinguishable from the typical plant in having secondary short lacinules at the central part of the thallus. The isotype (Yasuda no. 671), which was collected by Ogata in Prov. Iyo on October 2, 1922, is preserved in T. This form is rather common in central and south-western Japan. Among the specimens sent from U. S. National Herbarium on loan, two specimens, both of them being collected by C. Wright at Hong Kong in China, is identical with this form.

f. **angustata** Räsänen in Journ. Jap. Bot. **16**: 139 (1940).

A. speciosa var. *esorediata* f. *angustata* Sato, Index Plant. Nipp. IV Lichenes

9 et 115 (1943).

Thallus tenuior, 150~200μ crassae; laciniae angustatae, 0.5~1 mm latae. Ceterum ut in planta typica.

Distr.: Japan (Honsyu).

The isotype of this form (Yasuda no. 386) collected by A. Yasuda at Sendai on September 3, 1912 is preserved in T.

f. **condensata** Kurokawa f. nov.

Apothecia numerosissima et condensata. Ceterum ut in planta typica.

Distr.: Japan, Philippine and Formosa.

Specim. exam.: Japan. Honsyu. Prov. Awa: Mt. Kiyosumi (S. K. 56559, in K). Prov. Settu: Mt. Katuodera (May 3,1935, N. Ui—holotype in A and isotype in K). Philippine. Prov. Luzon. Baguio Mountain (August 1923, A. W. C. Herre 9682, in K). Formosa. Taityu-syu (台中州), Keitau (溪頭) (Dec. 29, 1933, Y. A. in A).

5. **Anaptychia isidiophora** (Nyl.) Vainio in Bot. Mag. Tokyo **32**: 156 (1918); Zahlbr., Cat. Lich. **7**: 729 (1931).

Physcia domingensis f. *isidiophora* Nyl. in Acta Soc. Scient. Fenn. **7**: 440 (1863) *Anaptychia speciosa* f. *isidiophora* Zahlbr. in Bot. Mag. Tokyo **41**: 364 (1927) et Cat. Lich. **7**: 742 (1931)—*Physcia speciosa* (non Nyl.) Nyl. in Journ. Linn. Soc. **20**: 67 (1884) et Lich. Jap. 32 (1890) pr. p.

Thallus cinereus vel cinereo-glaucescens, plagas usque 10~15 cm raro usque 20 cm latas formans, laciniatus; laciniae vulgo elongatae et lineares, crebre di- vel trichotome divisae, 1~2 mm latae, 0.2~0.35 mm crassae, superne planae vel convexae, contiguae vel subimbricatae, ad margines isidiosae; subtus omnino corticatae, albidae vel centrum versus leviter brunnescentes; in marginibus rhizinis thallo concoloribus vel apices versus obfuscatis et irregulariter divisis ornatae.

Cortex superior aequaliter vel subaequaliter incrassatus, 80~150μ crassus, ex hyphis parallelibus formatus, parte exteriore obscure cinerea, 20~30μ crassa; stratum gonidiale sub cortice superiore praeditum, continuum, ca. 30μ crassum, gonidiis 6~9μ diam.; stratum medullare 100~200μ crassum; cortex inferior vulgo sat incrassatus, 20~30 vel usque ad 40μ crassus.

Apothecia 1.5~5 mm lata, discis fusco-brunnescentibus, epruinosis; receptaculum thallo concolor, primum laevigatum sed demum sat isidiosum. Hymenium 120~150μ altum, J+coerulescens; epithecium leviter brunnescens; excipulum proprium una cum hypothecio 30~40μ altum; cortex receptaculi subaequaliter incrassatus; paraphyses in apicibus parum incrassatae, simplices; asci subclavati, 90~120×20~

26μ magni, 8-spori: sporae fusco-brunnescentes, ellipsoideae, apice rotundatae, medio non aut levissime constrictae, 1-septatae, 2-loculares, loculis rotundatis, 25~32×10~15μ magnae.

Reaction: thallus K−yellow: med. K−yellow, CaCl −, PD±pale yellow.

Chem. ingr.: atranorine, zeorin and undetermined substance identical with that of *A. hypoleuca*).

Hab.: on rocks and on bark of trees.

Distr.: Japan, Manchuria and Africa.

Jap. name: toge-gezigezigoke (new).

The present species resembles *A. esorediata* and *A. hypoleuca* var. *microphylla*, but from the former it is distinguished by presence of isidia and from the latter by presence of cortex on the undersurface of the laciniae and in equally or subequally thickened upper cortex. *A. isidiophora* seems to be widely distributed in

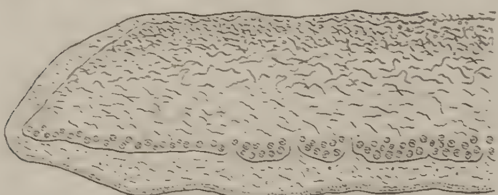


Fig. 8. Transverse section of thallus of *A. dissecta* (×100).

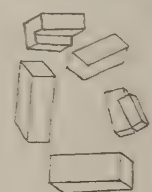


Fig. 9. Rectangular parallelopiped crystals obtained on heating Ac. X. of *A. dissecta* with o-T.

tropical and subtropical zones. Among the specimens sent from U. S. National Herbarium on loan one specimen collected by C. Wright at Simon's Bay in Cape of Good Hope is identical with this species.

6. **Anaptychia dissecta** Kurokawa sp. nov.

var. **dissecta**

Thallus cinerascens vel glaucescens, plagas 5~10 cm latas formans, substrato laxe adnatus, laciniatus: laciniae crebre dichotome aut partim subdigidatim divisae, contiguae vel rarius peripheriam versus subdiscretae, 0.7~2 mm latae, 0.15~0.3 mm crassae, ad margines microphyllino vel subisidioideo dissectae, demum etiam centrum versus isidiosae, divisionibus et isidiis demum ad apices sorediosis; subtus tenue corticatae vel apices versus decorticatae, albidae vel centrum versus leviter brunnescentes: in marginibus rhizinis thallo concoloribus et irregulariter divisis ornatae.

Cortex superior aequaliter vel subaequaliter incrassatus, 50~120μ crassus, ex

hyphis parallelibus formatus, parte exteriore obscure cinerea ca. 15μ crassa; stratum gonidiale continuum, 25~40μ crassum, gonidiis ca. 8μ diam.; stratum medullare 90 ~180μ crassum.

Apothecia rarissima, 1~5 mm lata, discis fusco-brunnescentibus, epruinosis; receptaculum thallo concolor, primum laevigatum sed mox sat isidiosum. Hymenium ca. 150μ altum, J+coerulescens; epithecium leviter brunnescens; excipulum proprium una cum hypothecio 30μ altum; paraphyses filiformes, in apicibus parum incrassatae, simplices, eseptatae; asci subclavati, 125×25μ magni, 8-spori; sporae fusco-brunnescentes, ellipsoideae, apice rotundatae, medio non aut levissime constrictae, 1-septatae, 2-loculares, loculis rotundatis vel obovoidibus, 28~32×12~16μ magnae.

Reaction: K+yellow; med. K+yellow, CaCl−, PD+deep yellow.

Chem. ingr.: atranorine, zeorin, norstictic acid, salazinic acid and undetermined substances A and B (A is identical with undet. substance of *A. hypoleuca*, but B is proper to this species).

Hab.: among mosses on rocks.

Distr.: Japan.

Jap. name: tizire-gezigezigoke.

Specim. exam.: Honsyu. Prov. Musasi: Mt. Takao (S. K. 51010, in K); Nippara (M. Togashi, in A and K). Prov. Mikawa: Mt. Horaizi (Jan. 7, 1956, S. K. 56029—holotype in A and isotype in K and M). Prov. Ise: Turugi-Pass (Y. A. in A). Prov. Kii: Mt. Koya (Y. Numaziri 79, in A and M; Y. Numaziri 738, in A; S. K. 56089-a, in K); Owase city, Kuki (M. Tagawa 373, in KU); Arita-gun, Simizu-tyo, Murokawa-dani (M. Tagawa and K. Iwatsuki 504, in K and KU). Prov. Settu: Siso-gun, Mt. Hunakosi (K. Utsumi, in A); Toyokawa-mura (N. Ui, in A). Kyusyu. Prov. Buzen: Simoge-gun, Sinyabakei, Kanbara (M. Togashi, in A).

This new species is closely related to *A. isidiophora*, from which it is distinguished by different chemical constituents. When the Ac. N. of the present species is heated with An. under cover glass, besides slender curved needles of *o*-toluidine compound of atranorine and double pyramid shaped crystals of zeorin the fusiform, deep yellow and thin plates are observed. Heating with o-T., rectangular parallelopiped and deep yellow crystals, which show straight extinction with respect to the long edges, appear. The PD+deep yellow reaction of medullar of the present species is due to this undetermined substance B.

var. **koyana** Kurokawa var. nov.

Statura thalli ut in planta typica, sed differt ab ea nec acidum norsticuticum nec acidum salazinicum continente.

Hab.: among mosses on rocks.

Distr.: Japan and Formosa.

Specim. exam.: Japan. Honsyu. Prov. Suruga: Mt. Huzi, Oomiya-guti, 2-gome (Y. A. in A). Prov. Mikawa: Minami-sitara-gum, Nagasino-mura (M. Mizutani, in A); Mt. Horaizi (S. K. 56014 and 56027, both in K). Prov. Kii: Mt. Koya April 4, 1956, S. K. 56027 holotype in A and isotype in K and US): Mt. Koya (Y. Numaziri, in M). Prov. Aki: Isl. Ituku-sima (Y. Ikoma 1426, in I). Sikoku. Prov. Tosa: Tosa-gun, Tosayama-mura, Zyo (I. Yoshimura 1163, in K and Y); Agawa-gun, Nanokawa-mura (Nobuhara 725, in Y). Formosa. Taityu-syu (台中州): Keitau (溪頭) (Y. A. in A).

○オオナンバンギセルの白花品 (浅野一男) Kazuo ASANO: A new form of *Aeginetia sinensis*.

純白花のオオナンバンギセルを三信国境の信濃国売木村ブナノネ山の尾根で 1958 年 8 月に発見した。ブナノネ山は，標高 1000 m から 1198.8 m の頂上まで，広範囲にわたつてオオナンバンギセルの生育をみ，その個体数も頗る多い，筆者は 1956 年より該地の植生調査を行なつているが，今夏はじめて，純白花品の混生していることを知つた。

花冠は純白であり，萼は淡黄色である。通常品と異なつており，未記載と思われるので，和名を花色に因んで，シロバナオオナンバンギセルとした。標本は東京大学に納めてある。

Aeginetia sinensis G. Beck forma **albiflora** Asano, f. nov.

Corollae candidae. Calyces tantum helvi.

Nom. Jap. Shirobana-ōnanbangiseru, nov.

Hab. Hondo: in monte Bunanone-yama, Urugi-mura, Shimoina-gun, Prov. Shinano. (K. Asano, Aug. 13, 1958: Typus in Herb. Univ. Tokyo.)

(長野県下伊那郡高森北小学校)

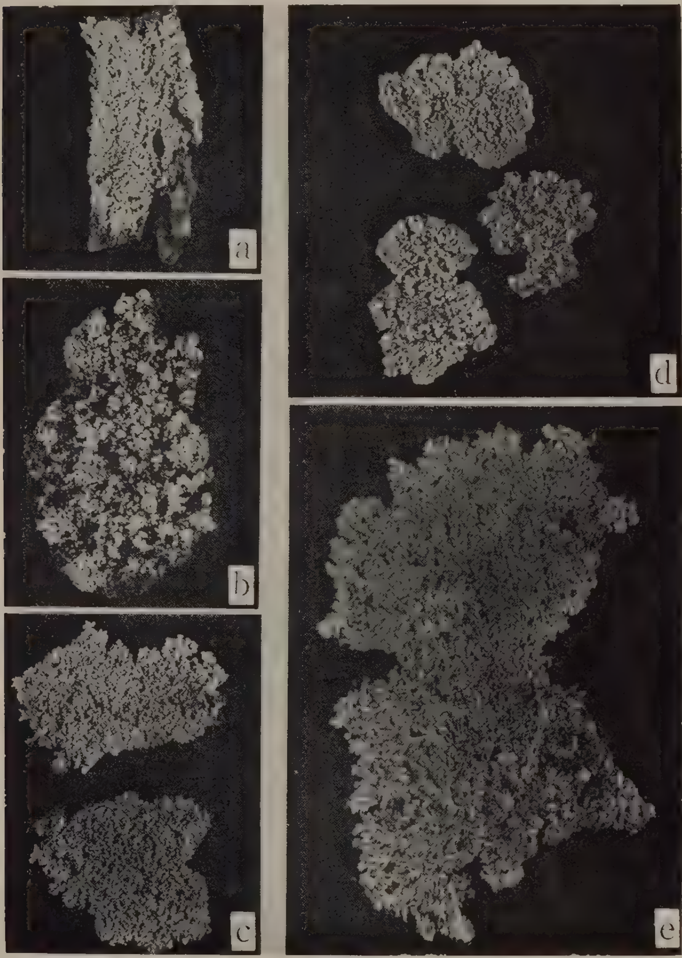


Plate 1. a: *A. speciosa* var. *microspora* from Aikawa, Saghalien (×1/2). b: Type of *A. pseudospeciosa* (×1/2). c: Type of *A. pseudospeciosa* f. *Tagawae* (×1/2). d: Type of *A. pseudospeciosa* var. *inactiva* (×1/2). e: *A. esorediata* (×1/2).

S. KUROKAWA: Anaptychiae

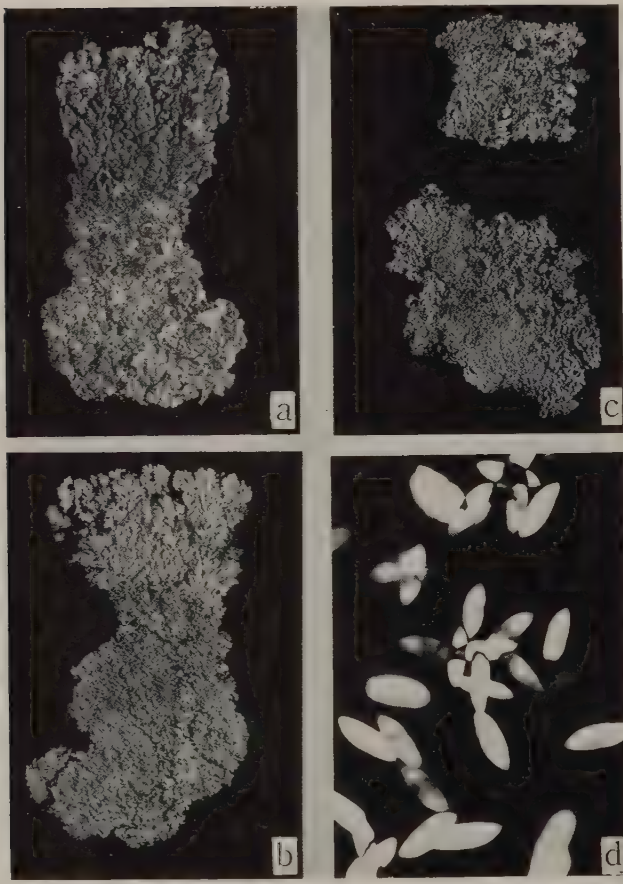


Plate 2. a: Type of. *A. esorediata* f. *subimbricata* (×1/2). b: *A. isidiophora* (×1/2) c: Type of *A. dissecta* (×1/2). d: Fusiform plates obtained on heating Ac. X. of *A. dissecta* with o-T.

S. KUROKAWA: Anaptychiae

Yasuji MORIMOTO:* Notes on rust fungi of Japan

森本泰二*: 日本産銹菌雑記

1. Puccinia punctata Link (Fig. 1)

Hab. III. On *Galium verum* var. *lacteum* (*Kawara-matsuba*); Hara-mura, Suwa-gun, Nagano Pref. (Nov. 2, 1958, Y. Morimoto.)

Teleutospores are variable in length and width according to different habitats. The size of the teleutospores and its investigators from different districts are as follows:

Cunningham:	materials from Newzealand	35–44×15–22 μ
Arthur :	materials from North America	37–56×16–26 μ
Ito :	materials from Japan	35–58×19–28 μ
Fischer :	materials from Europe	77–82×18–24 μ
Morimoto :	materials from Hara-mura, Japan	44–71×16–26 μ

This fungus is closely related to Fischer's one parasitic on *Galium Mollugo* and *Asperula odorata* (*Kurumaba-so*) in having attenuated inferior cell.

2. Puccinia moriokaensis S. Ito (Fig. 2.)

Hab. III. On *Phalaris arundinacea* var. *genuina* (*Kusayoshi*) Tsutsuga-mura, Yamagata-gun, Hiroshima Pref. (Nov. 24, 1957, Y. Morimoto).

Phalaris arundinacea is a new host plant for this fungus.

3. Puccinia hibayamensis Y. Morimoto, nov. spec. (Fig. 3, 4.)

Soris hypophyllis, sparsis, aggregatis vel seriatim dispositis, minutis, rotundatis vel ellipsoideis; primo epidermide tectis, dein nudis, pulvinatis, compactis, atro-brunneis vel atris; amphisporis obovatis, oblongis vel piriformibus, saepe angulatis, apice rotundatis, interdum applanatis, basi plerumque leniter attenuatis, levibus, flavo-brunneis vel castaneo-brunneis, 27–55 (raro 60)×17–27 μ; poris germinationis 2 vel 4, plerumque 3 aequatorialibus instructis; episporia 2–4 μ crasso, pedicello hyalino, usque 22–55 μ longo. Teleutosporls immixtis, ellipsoideis, lanceolatis, vel longe clavatis, apice rotundatis, vel conico-attenuatis, valde incrassatis (8–17 μ), medio leniter constrictis, basi attenuatis, pallide flavo-brunneis, 38–77 (raro 85)×11–22 μ; pedicello pallide flavo-brunneis, persistenti, usque 20–72 μ longo.

* Hiroshima Prefectural Yoshida High School, Yoshida-cho, Hiroshima Prefecture. 広島県吉田高等学校. 広島県高田郡吉田町.



Fig. 1–7. (×400) 1. Teleutospores of *Puccinia punctata* Link on *Galium verum* var. *lacteum*. 2. Teleutospores of *Puccinia moriokaensis* S. Ito on *Phalaris arundinacea*. 3, 4. Teleutospores and amphispores of *Puccinia hibayamensis* Y. Morimoto on *Carex multiflora*. 5. Teleutospores of *Puccinia iwakuniensis* Y. Morimoto on *Liriope graminifolia*. 6. Uredospores of *Puccinia iwakuniensis* Y. Morimoto on *Liriope graminifolia*. 7. Mesospores of *Puccinia iwakuniensis* Y. Morimoto on *Liriope graminifolia*.

Hab. III. On *Carex multiflora* (*Miyama-kan-suge*). Mt. Hibayama, Hiba-gun, Hiroshima Pref. (Dec. 15,1957, Y. Morimoto, type!)

The present species is closely related to *Puccinia hakodatensis* Hiratsuka, from which it distinctly differs by its longer teleutospores.

4. **Puccinia iwakuniensis** Y. Morimoto, nov. spec. (Fig. 5, 6, 7)

Soris uredosporiferis hypophyllis, maculo bullio, minutis, rotundatis, ca. 0.3 mm diam., laxe circulio aggregatis, in areis discoloribus castaneo-brunneis insidentibus, epidermide tectis; uredosporis obovatis, oblongis, subglobosis, 22–44×16–26 μ, episporio hyalino vel dilute flavo-brunneolis 2–3 μ crasso, echinulato. Teleutosporiferis hypophyllis, maculo bullio, minutis, 0.2-1.0 mm laxe aggregatis, rotundatis, oblongis, in areis discoloribus castaneo-brunneis insidentibus, diu epidermide tectis; brunneolis. Teleutosporis oblongis, cylindraceo-clavatis, 44–77 (raro 88)×13 22 μ, basi leniter attenuatis, medio modice constrictis, apice rotundatis vel conico-attenuatis, valde usque (7–17 μ) incrassatis, episporio dilute flavo-brunneolis, mesosporis immixtis, pedicello usque 22–77 μ longo, persistenti.

Hab. II, III. On *Liriope graminifolia* (*Yaburan*). Iwakuni, Kuga-gun, Yamaguchi Pref.; (April 16, 1939 & Oct. 16, 1939, Y. Morimoto, type!)

5. **Puccinia akiyoshidanensis** Y. Morimoto nov. spec. (Fig. 8, 9, 10.)

Soris teleutosporiferis amphigenis, pracipus hypophyllis, sparsis, minutis, 0.2–0.5 mm diam., rotundatis vel ellipsoideis in epiphyllis; sparsis vel dense aggregatis, mediocribus 0.5–1.0 mm diam., rotundatis vel ellipsoideis in hypophyllis; nudis, pulvinatis, compactis, atris. Teleutosporis oblongis, ellipsoideis vel longe-clavatis, 33–70 (raro 77–82)×10–22 μ (raro 24–26), apice attenuatis, raro rotundatis, valde incrassatis (3–11 μ), medio vix constrictis vel leniter constrictis, basi leniter attenuatis vel rotundatis, membrana castaneo-brunneis vel dilute flavo-brunneis, lebivus, pedicello dilute flavo-brunneis 66–130 μ (ad 250 μ) longo, mesosporis immixtis.

Hab. III. On *Phragmites longivalvis* (*Yoshi*).

Tsutsuga-mura, Yamagata-gun, Hiroshima Pref. (Nov. 24, 1957, Y. Morimoto); Kamiirie-Yoshida-cho, (Dec. 5, 1957, Y. Morimoto, type!), Miyano-jo, Yoshida-cho, Hiroshima Pref. (Nov. 15, 1958, Y. Morimoto.)

6. **Puccinia takikibicola** Y. Morimoto, nov. spec. (Fig. 11, 12, 13.)

Soris uredosporiferis amphigenis, sparsis, minutis, ellipsoideis, flavidis, diu epidermide tectis, dein fissa cinctis, pulverulentis; paraphysibus lenearibus 22–55 μ longis, lebivus, dilute flavidis vel hyalino intermixtee; uredosporis globosis, subglobosis vel ovatis, 20–33×14–27 μ, episporio 1.2–2 μ crasso, echinulatis. Soris teleutosporiferis

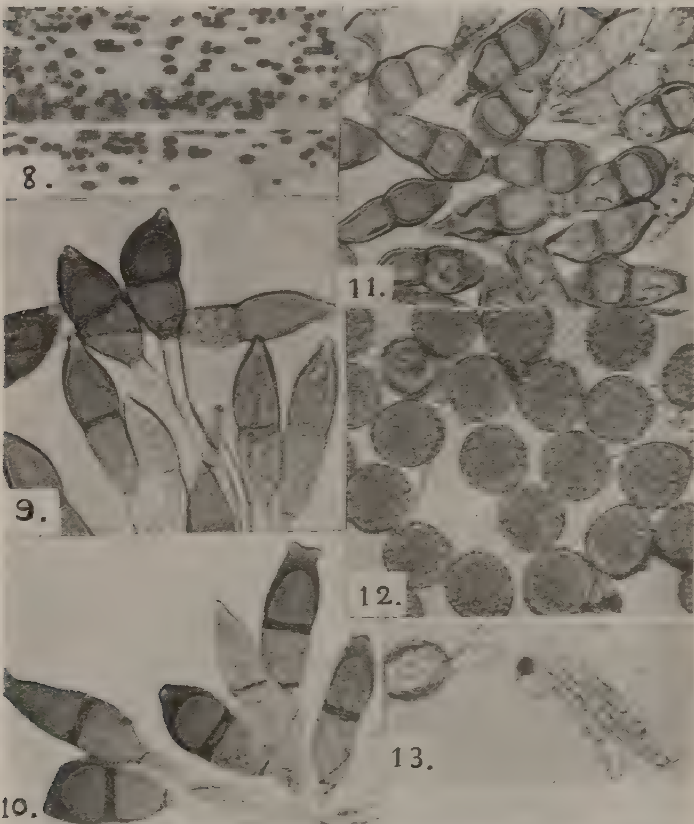


Fig. 8–13. (8×3, 9–13×400) 8. Teleutosorus of *Puccinia akiyoshidanensis* Y. Morimoto on *Phragmites longivalvis*. **9, 10. Teleutospores of *Puccinia akiyoshidanensis* Y.** Morimoto on *Phragmites longivalvis*. 11. Teleutospores of *Puccinia takikibicola* Y. Morimoto on *Phanebosperma globosum*. 12. Uredospores of *Puccinia takikibicola* Y. Morimoto on *Phanerosperma globosum*. 13. Paraphyses of *Puccinia takikibicola* Y. **Morimoto on *Phanerosperma globosum*.**

amphigenis, sparsis laxe aggregatis, minutis 0.2–0.3 mm diam., rotundatis vel ellipsoideis, diutius epidermide tectis dein fissa cinctis, vel semitectis, pulvinatis atris; teleutosporis ellipsoideis 27–52×12–22 μ, apex rotundatis, interdum conico-attenuatis, valde incrassatis 6–11 μ, medio leniter constrictis, basi rotundatis vel leniter atte-

nuatis, membrana flavo-brunneis vel dilute flavo-brunneis lebivus, pedicello dilute flavo-brunneis 16–38 μ longo, persistenti.

Hab. II. III. On *Phanerosperma globosum* (*Takikibi*). Tsutsuga-mura, Yamagata-gun, Hiroshima Pref. (Nov. 24, 1957; Oct. 15, 1958, Y. Morimoto type!); Yawatahama-shi, Ehime Pref. (July 17, 1939, T. Yoshinaga).

7. Puccinia Stipae-sibiricae S. Ito.

Hab. III. On *Stipa effusa*=*Stipa sibirica* (*Hane-gaya*). Shosen-Kyo, Yamanashi Pref. (Nov. 1, 1958, Y. Morimoto).

This teleutosorus is parasitic not on epiphyll but on hypophyll.

This fungus is new to Honshu!

The type specimens of the new species mentioned above are all deposited in the Morimoto Herbarium, Yoshida-cho, Takata-gun, Hiroshima Pref., Japan.

The writer wishes to express his heartiest thanks to Dr. S. Hatusima, Kagoshima University for the identification of the host plants, *Carex multiflora*, *Phalaris arundinacea*, and *Stipa effusa*.

○*Elsholtzia cristata* Willd. var. *minima* Nakai の出典（檜山庫三）

Kozo HIYAMA: The origin of *Elsholtzia cristata* Willd. var. *minima* Nakai.

最近北川政夫博士が済州島産のヒメナギナタコウジュの学名を *Elsholtzia pseudo-cristata* Lév. & Van. forma *minima* (Nakai) Kitag., stat. nov.（植研 **34**: 3. 1959）とされた際に異名の一つとして *E. cristata* var. *minima* Nakai を引用しその出典を植雑 **35**: 172. 1921 とされたが，そこには *E. cristata* var. *ramosa* Nakai forma *minima*（ut *Elscholtzia*）とあるから，これは何かの手違いによるものではないかと思われる。*E. cristata* var. *minima* Kakai は森為三：朝鮮植物名彙 301. 1922（ut *Elscholtzia*）に発表されたものであってこれは裸名であり，また Handel-Mazzetti (1939) もこれを異名として引用しているにすぎないから，この名はおそらく正式の発表を見ずにしまったのではあるまいか。

井 上　浩*: 日本産苔類ノート (1)

Hiroshi Inoue*: Miscellaneous notes on hepatics of Japan (1)

最近あつかつた数種の苔類についてここに一括して発表する。

1 **Lophozia** (*Leiocolea*) **heterocolpa** (Thed.) Howe, Mem. Torr. Bot. Club **7**: 108. 1899.—*Leiocolea heterocolpa* (Thed.) Buch, Mem. Soc. F. Fl. Fenn. **8**: 284. 1932.

Spec. Exam.: Akadake in Yatsugadake Mountains, Yamanashi Pref.; ca. 2700 m alt.: on humus among wetty rock crevices (conglomerate), occurring with *Bazzania fissifolia*, *Blepharostoma trichophyllum*, *Diplophyllum taxifolium* and some mosses; *H. Inoue no. 7699*, Aug. 1957. Distr.: Rather widely distributed in circumpolar regions: **new to Japan!**

本種はヨーロッパ、北米等の北極周辺地域に比較的広く分布し，ヒマラヤからも記録されている。日本からは未記録のものである。*Leiocolea* 亜属は独立属として取扱う場合もあるが，日本産のものでは *Leiocoela igiana* があるが，細胞膜面のパピラの状態や無性芽の存在によつて直ちに区別できる。

2 **Scapania ornithopodioides** (With.) Pers.: Inoue, Journ. Jap. Bot. **31**: 342, f. 2 (5–8). 1956.

Obs.: Sporangium oval: wall 4–5 strata, totally ca. 65μ thick, inner 3–4 layers composed of smaller cells, measuring 6–10μ thick, cells of innermost layer with deeply pigmented, mostly incompleted, tangentially thickened bands, outer 1 layer composed of larger cells, measuring ca. 25μ thich, with nodular thickenings mostly on longitudinal walls; spores 13–17μ, globose, with minutely punctate coat, deep brown; elaters 8–10μ wide, bispiral.

Oil-bodies 2–3 per cell, 4–6μ in spherical ones or 10–13×4–6μ in fusiform ones, grayish to faintly brownish gray.

Spec. Exam.: Mt. Kaikoma in southern Alps, Nagano Pref.; ca. 2400 m. alt.; on humus covering granite, occurring with *Plagiochila semidecurrens* (f. *undulata*), *Macrodiplophyllum plicatum*, and *Dicranum* sp.; *H. Inoue*, July 27, 1958: no male plant was observed.

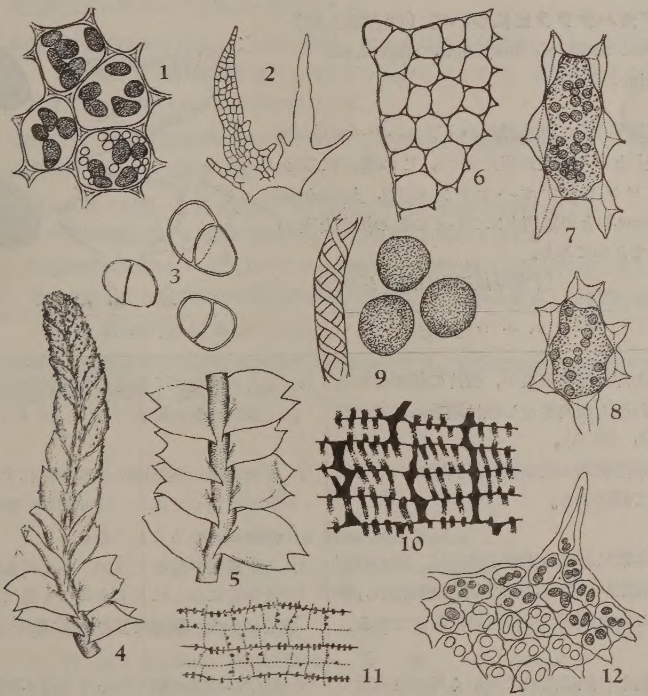
以前私は秩父産の資料によつて雌花を記載したが，昨夏南アルプス駒ヶ岳で本種の胞子体をつけたものを採ることができたので，上記の記載を追加しておく。*Subg. Proto-*

* 東京教育大学理学部植物学教室. Botanical Institute, Faculty of Science, Tokyo University of Education, Otsuka, Tokyo.

scapania では胞子体はすべての種において全く未知であつたが，他の *Scapania* 属のものと比較して胞子のうの内面の膜の肥厚状態が多少異なる位で属を分つ程のものではない。雌花は秩父産のものと同じである。雄花はみつかつていない。

3) **Pleurozia purpurea** (Lightf.) Lindb.: Ikegami, Journ. Hattori Bot. Lab. **18**: 68. 1957.

Oil-bodies 8–25 per cell, globose, 3–4μ, with numerous granules, grayish to faintly brownish gray. In the cells are observed numerous oil-drops, which are homogeneous and less than 1μ in diameter.



Figs. 1—6. *Lophozia heterocolpa*. 1. Cells from leaf-middle, showing oil-bodies and chloroplasts, ×750. 2. Underleaf, ×30. 3. Gemmae, ×750. 4. Gemmiparous shoot apex, ×10. 5. Part of plant, antical view, ×10. Figs. 7—8. *Pleurozia purpurea*. 7-8. Cells from leaf, showing oil-bodies and oil-drops, ×750. Figs. 9—12. *Scapania ornithopodioides*. 9. Spores and part of elater, ×750. 10. Outer layer of capsule-wall, ×300. 11. Inner layer of capsule-wall, ×300. 12. Cells from leaf-margin, showing oil-bodies, ×600.

Spec. Exam.: Mt. Kaikoma in southern Alps, Nagano Pref.; ca. 2700 m alt.; on humus covering granite, associated with *Plagiochila semidecurrens* (f. *undulata*), *Dicranum* sp., *Macrodiplophyllum plicatum*, and some mosses; *H. Inoue*, July 27, 1968. Previously known only from Mts. Tanigawa in Japan.

日本では群馬県谷川連峰から最近記録された顕著な苔類であるが，南アルプス駒ケ岳で発見した。ヨーロッパのもので記載されている油体と多少異なるので上のように南アルプスのものについて記載しておいたが，谷川岳のものでも同様である。

○アカハナワラビについて（行方富太郎）

Some notes on *Botrychium nipponicum* Makino.



本誌第5号に西田誠氏の「アカハナワラビの再認識」という論文が出たので，この機会にアカハナワラビとオオハナワラビ（*B. japonicum* Underw.）との区別点についての私の観察を次の表にまとめてみた。

（千葉県成田市日本シダの会）

アカハナワラビ	オオハナワラビ
(1) 羽片の幅は狭長で，裂片の鋸歯は切込みが深く鋭角をなし脈は顕著に葉面に現れる（図 A)。	(1) 羽片の幅は広く裂片の鋸歯は切込みが浅く鈍角で脈は顕著でない（図 B)。
(2) 草性軟弱で実葉柄は降霜期に入ると枯れて倒伏する。	(2) 草性強剛で実葉柄は冬季中枯れず翌春4月まで立つている。往々前年の裸葉まで残存していることがある。
(3) 冬季における裸葉の紅変は，葉の表面裏面葉柄に及び，色は黒紫紅色を呈し，単にこの色調だけでも区別は明かである。	(3) 冬季裸葉が紅変するが，多くは葉縁に止まり稀に中心に及ぶものでも色は赤褐色を呈し葉の裏面と葉柄とは緑色である。
(4) 胞子の皺は極めて細かく周辺は全円である（図 C)。	(4) 胞子には荒い皺があって周辺に微細な凹凸を生ずる（図 D)。
(5) 分布：温帯性で日本中部から関東地方に稀に分布する。	(5) 分布：暖帯性で日本中部・関東にも分布するが西南地方に多産する。

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